

REMARKS

Pending Claims

Claims 1, 9, 10, 28, 38, and 40 have been amended in order to more clearly describe Applicant's invention. Claims 3, 4, 5, 8, and 11 have been cancelled in view of the amendment to claim 1. No new matter has been added. Therefore, claims 1-2, 6-7, and 9-41 are pending.

Summary of the Invention

The present invention relates inkjet ink systems which comprise a) a liquid vehicle, b) a colorant, and c) a gelling agent. The gelling agent may be incorporated either into the liquid vehicle, into a second jettable composition, or onto a substrate. The gelling agent may also be attached to the colorant. In addition, several methods of generating an image are also described which utilize compositions comprising a gelling agent.

Rejection of Claims under 35 U.S.C. § 102

Shields et al.

The Examiner has rejected claims 1-2, 4, 21, 26, 28-34, and 37-41 as being anticipated by Shields et al. (U.S. Patent No. 5,476,540). Applicant respectfully disagrees.

In paragraph 2 of the Office Action, the Examiner states that Shields et al. discloses an ink jet system comprising a first ink or gelling composition comprising 0.1-10% gel-forming species, an aqueous liquid vehicle, and a dye, wherein the gelling composition has a pH effective to cause gelling of the image. The Examiner also states that, in another embodiment, the ink is printed onto a printing medium that is pre-treated with gel-forming species. The Examiner further states that a method of generating an image is disclosed comprising incorporating the ink and gelling composition into an ink jet printer, jetting the ink and gelling composition onto a substrate, and generating an image, and the

ink is either printed before or after the gelling composition. The Examiner concludes that, in light of the above, it is clear that Shields et al. anticipates the present claims.

Regarding claims 1-2, 4, and 21-26, as amended, claim 1 relates to an inkjet ink system comprising: a) a liquid vehicle; b) a colorant; and c) a gelling agent. The colorant is a modified pigment comprising a pigment having attached at least one organic group and the gelling agent is a hydrophobically modified polyelectrolyte.

In comparison, Shields et al. discloses a method of printing images using two compositions, one comprising a gel-forming species and one comprising a gel-initiating species. At least one of the two compositions includes at least one coloring agent. Exemplary coloring agents include various water-soluble dyes (see column 2, lines 62-67). There is no disclosure of the use of pigment-type coloring agents. More particularly, there is no disclosure of the use of a modified pigment comprising a pigment having attached at least one organic group. Only soluble colorants are disclosed. Furthermore, while Shields et al. discloses various types of gelling agents that can be used in a two-component printing system (see column 2, lines 45-53), the only polymeric gelling agent disclosed is polyvinyl alcohol. There is no disclosure of the use of a hydrophobically modified polyelectrolyte, which one of ordinary skill in the art would recognize as a special type of gelling agent. These are described in more detail in, for example, paragraphs [0044]-[0048] and paragraphs [0068]-[0069] of the present application and are not the gelling agents of Shields et al.

Therefore, Applicant believes that Shields et al. does not disclose the inkjet ink system of claim 1 comprising the combination of a modified pigment and a hydrophobically modified polyelectrolyte gelling agent, and therefore Shields et al. does not anticipate this claim. Claims 2 and 21-26, which depend either directly or indirectly from claim 1, disclose further embodiments of the present invention and, for at least the reasons discussed above, are also not anticipated by Shields et al. Claim 4 has been cancelled, making the rejection of this claim moot.

Regarding claims 28-34 and 37-41, claim 28 relates to a method of generating a printed image comprising the steps of: i) incorporating into a printing apparatus an inkjet ink composition comprising: a) a liquid vehicle, b) a colorant, and c) a gelling agent; ii) jetting the inkjet ink

composition; and iii) generating an image onto a substrate, wherein the substrate optionally comprises a gelling agent. Claim 38 relates to a method of generating a printed image comprising the steps of: i) incorporating into a printing apparatus an inkjet ink composition comprising: a) a liquid vehicle and b) a colorant; ii) incorporating into a printing apparatus a gelling agent composition comprising: a) a liquid vehicle and b) a gelling agent; iii) jetting, in any order, the inkjet ink composition and the gelling agent composition, and iv) generating an image onto a substrate. Claim 40 relates to a method of generating a printed image comprising the steps of: i) incorporating into a printing apparatus an inkjet ink composition comprising: a) a liquid vehicle and b) a colorant; ii) jetting the inkjet ink composition, and iii) generating an image onto a substrate, wherein the substrate comprises a gelling agent. As amended, each of claims 28, 38, and 40 recite that the colorant is a modified pigment comprising a pigment having attached at least one organic group and the gelling agent is a hydrophobically modified polyelectrolyte.

In comparison, and as discussed in more detail above, Shields et al. does not disclose an inkjet ink system comprising a modified pigment comprising a pigment having attached at least one organic group and also comprising a hydrophobically modified polyelectrolyte gelling agent. Thus, Shields et al. also does not disclose a method of generating a printed image using such a colorant and gelling agent combination.

Therefore, Applicant believes that claims 28, 38, and 41 are not anticipated by Shields et al. Claims 29-34, 39, and 41, which depend either directly or indirectly from claims 28, 38, or 41, disclose further embodiments of the present invention and, for at least the reasons discussed above, are also not anticipated by Shields et al.

Applicant therefore believes that claims 1-2, 4, 21-26, 28-34, and 37-41 are not anticipated by Shields et al. and respectfully request that this rejection be withdrawn.

Sacripante et al.

The Examiner has rejected claims 1-7, 21-24, 26, and 28 under 35 U.S.C. § 102(b) as being anticipated by Sacripante et al. (U.S. Patent No. 5,989,325). Applicant respectfully disagrees.

In paragraph 3 of the Office Action, the Examiner states that Sacripante et al. discloses a nonaqueous ink comprising a liquid vehicle, a colorant such as a dye or pigment including carbon black, and 0.5-10% of a gelling component. The Examiner also states that a method of generating an image is also disclosed comprising incorporating the ink into an ink jet printer, jetting the ink onto a substrate, and generating an image. The Examiner concludes that, in light of the above, it is clear that Sacripante et al. anticipates the present claims.

Regarding claims 1-7, 21-24, and 26, as amended, claim 1 relates to an inkjet ink system comprising: a) a liquid vehicle; b) a colorant; and c) a gelling agent. The colorant is a modified pigment comprising a pigment having attached at least one organic group and the gelling agent is a hydrophobically modified polyelectrolyte.

In comparison, Sacripante et al. discloses a non-aqueous ink composition comprising a vehicle, a colorant, and a hydrophobic gelling agent. The inks of Sacripante et al. are phase change or hot melt type inks (see column 4, lines 22-67). The inks have a melting point in the range of from about 25°C to about 60°C (see column 6, lines 21-23). Thus, the inks do not comprise a liquid vehicle. In addition, while the colorant of the ink of Sacripante et al. may be a dye or a pigment, there is no disclosure of the use of a modified pigment, and, in particular, a modified pigment having attached at least one organic group. Furthermore, while Sacripante et al. discloses gelling agents, these have a trans 4-tertiary-butyl-1-phenyl-cyclohexanol formula (see Formula shown in column 6 and description in column 8, lines 17-35). There is no disclosure of the use of a polymeric gelling agent. More particularly, there is no disclosure of the use of a hydrophobically modified polyelectrolyte. One of ordinary skill in the art would recognize that this is a special type of gelling agent. These are described in more detail in, for example, paragraphs [0044]-[0048] and paragraphs [0068]-[0069] of the present application and are not the gelling agents of Sacripante et al.

Thus, Applicant believes that Sacripante et al. does not disclose the inkjet ink system of claim 1 comprising the combination of a modified pigment and a hydrophobically modified polyelectrolyte gelling agent, and therefore Sacripante et al. does not anticipate this claim. Claims 2, 6-7, 21-24, and 26, which depend either directly or indirectly from claim 1, disclose further embodiments of the present invention and, for at least the reasons discussed above, are also not anticipated by Sacripante et al. Claims 3 and 4 have been cancelled, making the rejection of these claims moot.

Regarding claim 28, as amended, this claim relates to a method of generating a printed image comprising the steps of: i) incorporating into a printing apparatus an inkjet ink composition comprising: a) a liquid vehicle, b) a colorant, and c) a gelling agent; ii) jetting the inkjet ink composition; and iii) generating an image onto a substrate, wherein the substrate optionally comprises a gelling agent. The colorant is a modified pigment comprising a pigment having attached at least one organic group and the gelling agent is a hydrophobically modified polyelectrolyte.

In comparison, and as discussed in more detail above, Sacripante et al. does not disclose an inkjet ink system comprising a modified pigment comprising a pigment having attached at least one organic group and also comprising a hydrophobically modified polyelectrolyte gelling agent. Thus, Sacripante et al. also does not disclose a method of generating a printed image using such a colorant and gelling agent combination.

Therefore, Applicant believes that claim 28 is not anticipated by Sacripante et al.

Applicant therefore believes that claims 1-7, 21-24, 26, and 28 are not anticipated by Sacripante et al. and respectfully request that this rejection be withdrawn.

EP 1148104

The Examiner has rejected claims 1-4, 6-7, 19, 21-31, and 38-41 under 35 U.S.C. § 102(a) as being anticipated by EP 1148104. Applicant respectfully disagrees.

In paragraph 4 of the Office Action, the Examiner states that EP 1148104 discloses an ink jet ink system comprising an ink that comprises water, solvent, and a colorant including a water-insoluble dye and pigment such as carbon black and a fixer fluid or gelling composition that comprises water,

solvent, and a gelling agent which is polyvinyl alcohol possessing a molecular weight of 1000-250,000 or polyethyleneimine possessing a molecular weight of 2000. The Examiner also states that it is disclosed that the gelling composition has a pH effective to cause gelling of the image. The Examiner further states that a method of generating an image is also disclosed comprising incorporating the ink and gelling composition into an ink jet printer, jetting the ink and gelling composition onto a substrate, and generating an image, and that the ink is either printed before or after the gelling composition. Finally, the Examiner states that a method of generating an image is also disclosed comprising incorporating the ink into an ink jet printer and jetting the ink onto a substrate which comprises a coating of the gelling agent. The Examiner concludes that, in light of the above, it is clear that EP 1148104 anticipates the present claims.

Regarding claims 1-4, 6-7, 19, and 21-27, as amended, claim 1 relates to an inkjet ink system comprising: a) a liquid vehicle; b) a colorant; and c) a gelling agent. The colorant is a modified pigment comprising a pigment having attached at least one organic group and the gelling agent is a hydrophobically modified polyelectrolyte.

In comparison, EP 1148104 discloses an inkset for inkjet printing comprising at least one fixer fluid which comprises polyvinyl alcohol and/or polyethyleneimine and a least one ink comprising a colorant. Various colorants may be used, including Cabojet pigments (see paragraph [0014]), which are modified pigments having attached organic groups. The fixer fluid may be used either as an underprint or as an overprint and is described as forming a protective layer over the printed material. In addition, a second fixer fluid comprising a borate may be used in combination with the first fixer fluid to crosslink the polyvinyl alcohol, forming a gelatinous film (see paragraph [0005]). However, these are not the inkjet ink systems of the present invention. In particular, EP 1148104 does not disclose the use of hydrophobically modified polyelectrolyte gelling agents. Only polyvinyl alcohol in combination with a borate are disclosed as forming a gelled material, and this polymer is not a polyelectrolyte. One of ordinary skill in the art would recognize that hydrophobically modified polyelectrolytes are a special type of gelling agent. These are described in more detail in, for example, paragraphs [0044]-[0048] and paragraphs [0068]-[0069] of the present application and are not the gelling agents of EP

1148104.

Thus, Applicant believes that EP 1148104 does not disclose the inkjet ink system of claim 1 comprising the combination of a modified pigment and a hydrophobically modified polyelectrolyte gelling agent, and therefore EP 1148104 does not anticipate this claim. Claims 2, 6-7, and 21-27, which depend either directly or indirectly from claim 1, disclose further embodiments of the present invention and, for at least the reasons discussed above, are also not anticipated by EP 1148104. Claims 3 and 4 have been cancelled, making the rejection of these claims moot.

Regarding claims 28-31 and 38-41, claim 28 relates to a method of generating a printed image comprising the steps of: i) incorporating into a printing apparatus an inkjet ink composition comprising: a) a liquid vehicle, b) a colorant, and c) a gelling agent; ii) jetting the inkjet ink composition; and iii) generating an image onto a substrate, wherein the substrate optionally comprises a gelling agent. Claim 38 relates to a method of generating a printed image comprising the steps of: i) incorporating into a printing apparatus an inkjet ink composition comprising: a) a liquid vehicle and b) a colorant; ii) incorporating into a printing apparatus a gelling agent composition comprising: a) a liquid vehicle and b) a gelling agent; iii) jetting, in any order, the inkjet ink composition and the gelling agent composition, and iv) generating an image onto a substrate. Claim 40 relates to a method of generating a printed image comprising the steps of: i) incorporating into a printing apparatus an inkjet ink composition comprising: a) a liquid vehicle and b) a colorant; ii) jetting the inkjet ink composition, and iii) generating an image onto a substrate, wherein the substrate comprises a gelling agent. As amended, each of claims 28, 38, and 40 recite that the colorant is a modified pigment comprising a pigment having attached at least one organic group and the gelling agent is a hydrophobically modified polyelectrolyte.

In comparison, and as discussed in more detail above, EP 1148104 does not disclose an inkjet ink system comprising a modified pigment comprising a pigment having attached at least one organic group and also comprising a hydrophobically modified polyelectrolyte gelling agent. Thus, EP 1148104 also does not disclose a method of generating a printed image using such a colorant and gelling agent combination.

Therefore, Applicant believes that claims 28, 38, and 41 are not anticipated by EP

1148104. Claims 29-31, 39, and 41, which depend either directly or indirectly from claims 28, 38, or 41, disclose further embodiments of the present invention and, for at least the reasons discussed above, are also not anticipated by EP 1148104.

Applicant therefore believes that claims 1-4, 6-7, 19, 21-31, and 38-41 are not anticipated by EP 1148104 and respectfully request that this rejection be withdrawn.

WO 00/37168

The Examiner has rejected claims 1-3, 6-7, 11, 19, 21, 26, and 28 under 35 U.S.C. § 102(b) as being anticipated by WO 00/37168. Applicant respectfully disagrees.

In paragraph 5 of the Office Action, the Examiner states that WO 00/37168 discloses an ink jet ink comprising an aqueous liquid vehicle, a colorant including a pigment such as carbon black, and a hydrophobically modified polyelectrolyte possessing a molecular weight of up to 100,000 wherein the polyelectrolyte is a hydrophilic homopolymer or copolymer comprising an ionizable monomer. The Examiner also states that a method of generating an image is also disclosed comprising incorporating the ink into an ink jet printer, jetting the ink onto a substrate, and generating an image. The Examiner concludes that, in light of the above, it is clear that WO 00/37168 anticipates the present claims.

Regarding claims 1-3, 6-7, 11, 19, 21, and 26, as amended, claim 1 relates to an inkjet ink system comprising: a) a liquid vehicle; b) a colorant; and c) a gelling agent. The colorant is a modified pigment comprising a pigment having attached at least one organic group and the gelling agent is a hydrophobically modified polyelectrolyte.

In comparison, WO 00/37168 discloses dispersants that strongly absorb to hydrophobic particles in aqueous media which comprise a hydrophobic segment and a hydrophilic segment. The hydrophilic segment comprises a polyelectrolyte. These dispersants are described as having applicability as pigment dispersants in inkjet ink printing and can be used with a variety of pigments (see page 10, line 29 to page 11, line 28). However, there is no disclosure of the use of a modified pigment comprising a pigment having attached at least one organic group. Only conventional pigments are disclosed. Furthermore, while dispersants having hydrophobic and polyelectrolyte segments are described, these are dispersants and not the hydrophobically

modified polyelectrolyte gelling agents of the present invention. No gellation of this dispersant is described anywhere in WO 00/37168. In fact, WO 00/37168 teaches away from gel formation by the dispersant. For example, Dispersants D and F are prepared from a mixture of chain transfer agents to prepare dispersants with a mixture of at least two structures (see page 17, lines 9-17 and page 18, lines 13-22). The presence of one component decreases molecular entanglements or crosslinking thereby avoiding insoluble network (gel) formation. Thus, the dispersants of WO 00/37168 are not gelling agents and, in particular, are not hydrophobically modified polyelectrolyte gelling agents.

Thus, Applicant believes that WO 00/37168 does not disclose the inkjet ink system of claim 1 comprising the combination of a modified pigment and a hydrophobically modified polyelectrolyte gelling agent, and therefore WO 00/37168 does not anticipate this claim. Claims 2, 6-7, 19, 21, and 26, which depend either directly or indirectly from claim 1, disclose further embodiments of the present invention and, for at least the reasons discussed above, are also not anticipated by WO 00/37168. Claims 3 and 11 have been cancelled, making the rejection of this claim moot.

Regarding claim 28, as amended, this claim relates to a method of generating a printed image comprising the steps of: i) incorporating into a printing apparatus an inkjet ink composition comprising: a) a liquid vehicle, b) a colorant, and c) a gelling agent; ii) jetting the inkjet ink composition; and iii) generating an image onto a substrate, wherein the substrate optionally comprises a gelling agent. The colorant is a modified pigment comprising a pigment having attached at least one organic group and the gelling agent is a hydrophobically modified polyelectrolyte.

In comparison, and as discussed in more detail above, WO 00/37168 does not disclose an inkjet ink system comprising a modified pigment comprising a pigment having attached at least one organic group and also comprising a hydrophobically modified polyelectrolyte gelling agent. Thus, WO 00/37168 does not disclose a method of generating a printed image using such a colorant and gelling agent combination.

Therefore, Applicant believes that claim 28 is not anticipated by WO 00/37168.

Applicant therefore believes that claims 1-3, 6-7,11, 19, 21, 26, and 28 are not anticipated by WO 00/37168 and respectfully request that this rejection be withdrawn.

Grezzo Page et al.

The Examiner has rejected claims 1-3, 6-10, 12-19, 21-24, and 26-28 under 35 U.S.C. § 102(b) as being anticipated by Grezzo Page et al. (U.S. Patent No. 5,708,095). Applicant respectfully disagrees.

In paragraph 6 of the Office Action, the Examiner states that Grezzo Page et al. discloses an ink jet ink comprising an aqueous liquid vehicle, a colorant including carbon black modified with a carboxylic acid, and 0.1-30% graft copolymer which comprises macromonomer side chains obtained from styrene and ethoxytriethyleneglycol methacrylate and a backbone obtained from (meth)acrylic acid and ethyl acrylate. The Examiner also states that the graft copolymer has a molecular weight of 1000-100,000 and that it is further disclosed that the pigment binds to the graft copolymer. The Examiner further states that a method of generating an image is also disclosed comprising incorporating the ink into an ink jet printer, jetting the ink onto a substrate, and generating an image. The Examiner concludes that, in light of the above, it is clear that Grezzo Page et al. anticipates the present claims.

Regarding claims 1-3, 6-10, 12-19, 21-24, and 26-27, as amended, claim 1 relates to an inkjet ink system comprising: a) a liquid vehicle; b) a colorant; and c) a gelling agent. The colorant is a modified pigment comprising a pigment having attached at least one organic group and the gelling agent is a hydrophobically modified polyelectrolyte.

In comparison, Grezzo Page et al. discloses graft polymers having a water soluble hydrophilic backbone and at least one discrete hydrophobic side chain, which can be used, for example, as dispersants for pigments in ink jet inks. Various types of pigments are described (see column 6, line 66 to column 7, line 15). However, there is no disclosure of the use of a modified pigment comprising a pigment having attached at least one organic group. Only conventional pigments are disclosed. Furthermore, while the graft polymers of Grezzo Page et al. have hydrophilic and hydrophobic segments, there is no gellation of this dispersant described anywhere

in Grezzo Page et al. Thus, the copolymers of Grezzo Page et al. are not gelling agents and, in particular, are not the hydrophobically modified polyelectrolyte gelling agent of the present invention, which are a special type of gelling agent familiar to one of ordinary skill in the art and described in more detail in, for example, paragraphs [0044]-[0048] and paragraphs [0068]-[0069] of the present application. Rather, these are dispersants with hydrophilic/hydrophobic structures similar to those of conventional dispersants (see column 1, line 39 to column 2, line 14 of Grezzo Page et al.).

Thus, Applicant believes that Grezzo Page et al. does not disclose the inkjet ink system of claim 1 comprising the combination of a modified pigment and a hydrophobically modified polyelectrolyte gelling agent, and therefore Grezzo Page et al. does not anticipate this claim. Claims 2, 6-10, 12-19, 21-24, and 26-27, which depend either directly or indirectly from claim 1, disclose further embodiments of the present invention and, for at least the reasons discussed above, are also not anticipated by Grezzo Page et al. Claim 3 has been cancelled, making the rejection of this claim moot.

Regarding claim 28, as amended, this claim relates to a method of generating a printed image comprising the steps of: i) incorporating into a printing apparatus an inkjet ink composition comprising: a) a liquid vehicle, b) a colorant, and c) a gelling agent; ii) jetting the inkjet ink composition; and iii) generating an image onto a substrate, wherein the substrate optionally comprises a gelling agent. The colorant is a modified pigment comprising a pigment having attached at least one organic group and the gelling agent is a hydrophobically modified polyelectrolyte.

In comparison, and as discussed in more detail above, Grezzo Page et al. does not an inkjet ink system comprising a modified pigment comprising a pigment having attached at least one organic group and also comprising a hydrophobically modified polyelectrolyte gelling agent. Thus, Grezzo Page et al. also does not disclose a method of generating a printed image using such a colorant and gelling agent combination.

Therefore, Applicant believes that claim 28 is not anticipated by Grezzo Page et al.

Applicant therefore believes that claims 1-3, 6-10, 12-19, 21-24, and 26-28 are not anticipated by Grezzo Page et al. and respectfully request that this rejection be withdrawn.

Maeda et al.

The Examiner has rejected claims 1-7, 19-24, 26, 28, and 35-36 under 35 U.S.C. § 102(b) as being anticipated by Maeda et al. (U.S. Patent No. 5,969,740). Applicant respectfully disagrees.

In paragraph 7 of the Office Action, the Examiner states that Maeda et al. discloses an ink jet ink comprising an aqueous liquid vehicle, a colorant including a water-insoluble dye and a pigment such as carbon black, and 0.005-10% thickening polymer possessing a molecular weight of 1,000-1,000,000 wherein the polymer gels upon heating. The Examiner also states that a method of generating an image is also disclosed comprising incorporating the ink into an ink jet printer, jetting the ink onto a substrate, and generating an image. The Examiner concludes that, in light of the above, it is clear that Maeda et al. anticipates the present claims.

Regarding claims 1-7, 19-24, and 26, as amended, claim 1 relates to an inkjet ink system comprising: a) a liquid vehicle; b) a colorant; and c) a gelling agent. The colorant is a modified pigment comprising a pigment having attached at least one organic group and the gelling agent is a hydrophobically modified polyelectrolyte.

In comparison, Maeda et al. discloses an ink-jet recording process comprising the use of an ink containing a coloring matter, a liquid medium, and at least one thermoreversible thickening polymer. While various coloring matters are described (see column 8, line 24 to column 9, line 20), there is no disclosure of the use of a modified pigment comprising a pigment having attached at least one organic group.

In addition, the thermoreversible thickening polymers of Maeda et al. are not gelling agents as in the present application. Rather, these polymers gel thermoreversibly upon sensing a temperature at or above their transition temperature, and, when jetted at a temperature above the transition temperature, the ink droplet is changed in state while it is ejected (see column 3, lines 19-34). This allows for control over viscosity of at least part of the ink, which also effects dot size and color properties (see column 3, lines 49-59 and column 12, line 53 to column 13, line 13). Since the polymers are thermoreversible, the effect can be initiated by heating. However, upon cooling, the effect would be expected to reverse. In comparison, as disclosed in amended

claim 1, the inkjet ink system of the present invention comprises a hydrophobically modified polyelectrolyte gelling agent, which one of ordinary skill in the art would recognize is a special type of gelling agent. These are described in more detail in, for example, paragraphs [0044]-[0048] and paragraphs [0068]-[0069] of the present application.

Thus, Applicant believes that Maeda et al. does not disclose the inkjet ink system of claim 1 comprising the combination of a modified pigment and a hydrophobically modified polyelectrolyte gelling agent, and therefore Maeda et al. does not anticipate this claim. Claims 2, 6-7, 19-24, and 26, which depend either directly or indirectly from claim 1, disclose further embodiments of the present invention and, for at least the reasons discussed above, are also not anticipated by Maeda et al. Claims 3 and 4 have been cancelled, making the rejection of this claim moot.

Regarding claims 28 and 35-36, as amended, claim 28 relates to a method of generating a printed image comprising the steps of: i) incorporating into a printing apparatus an inkjet ink composition comprising: a) a liquid vehicle, b) a colorant, and c) a gelling agent; ii) jetting the inkjet ink composition; and iii) generating an image onto a substrate, wherein the substrate optionally comprises a gelling agent. The colorant is a modified pigment comprising a pigment having attached at least one organic group and the gelling agent is a hydrophobically modified polyelectrolyte.

In comparison, and as discussed in more detail above, Maeda et al. does not disclose an inkjet ink system comprising a modified pigment comprising a pigment having attached at least one organic group and also comprising a hydrophobically modified polyelectrolyte gelling agent. Thus, Maeda et al. also does not disclose a method of generating a printed image using such a colorant and gelling agent combination.

Therefore, Applicant believes that claim 28 is not anticipated by Maeda et al. Claims 35-36, which depend directly from claim 28, disclose further embodiments of the present invention and, for at least the reasons discussed above, are also not anticipated by Maeda et al.

Applicant therefore believes that claims 1-7, 19-24, 26, 28 and 35-36 are not anticipated by Maeda et al. and respectfully request that this rejection be withdrawn.

Rejection of Claims under 35 U.S.C. § 103(a)

The Examiner has rejected claims 8-10 under 35 U.S.C. § 103(a) as being unpatentable over EP 1148104, WO 00/37168, Grezzo Page et al. (U.S. Patent No. 5,708,095), or Maeda et al. (U.S. Patent No. 5,969,740), any of which in view of Belmont et al. (U.S. Patent No. 5,571,311). Applicant respectfully disagrees.

In paragraph 9 of the Office Action, the Examiner incorporates by reference the disclosures of EP 1148104, WO 00/37168, Grezzo Page et al., and Maeda et al. in paragraphs 4, 5, 6, and 7 of the Office Action, and states that the difference between EP 1148104, WO 00/37168, Grezzo Page et al., and Maeda et al. is the requirement in the claims of a specific type of pigment. The Examiner also states that each of the references disclose the use of a pigment, but there is no disclosure in any of them of a modified pigment having attached at least one organic group. The Examiner further states that Belmont et al. discloses the use of a modified pigment having attached organic groups such as carboxylic acid in ink jet inks and also states that the motivation for using such a pigment is that the pigment has increased water dispersibility as compared to untreated pigments. The Examiner concludes that, in light of the motivation for using modified pigments disclosed by Belmont et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use such modified pigment in the ink of EP 1148104, WO 00/37168, Grezzo Page et al., or Maeda et al., and thereby arrive at the claimed invention.

Claim 8 has been cancelled, making the rejection of this claim moot. However, claim 1 has been amended to include the features of claim 8. Thus, the Examiner's comments will be discussed relative to claim 1. As amended, claim 1 relates to an inkjet ink system comprising: a) a liquid vehicle; b) a colorant; and c) a gelling agent. The colorant is a modified pigment comprising a pigment having attached at least one organic group and the gelling agent is a hydrophobically modified polyelectrolyte.

Regarding EP 1148104, this reference teaches an inkset for inkjet printing comprising at least one fixer fluid which comprises polyvinyl alcohol and/or polyethyleneimine and at least one ink comprising a colorant. Various colorants are described, including, for example, Cabojet pigments,

which are modified pigments having attached organic groups. A second fixer fluid comprising a borate may also be used in combination with the first fixer fluid to crosslink the polyvinyl alcohol, forming a gelatinous film (see paragraph [0005]). However, as discussed in more detail above, these are not the inkjet ink systems of the present invention because the gelling agent is not a hydrophobically modified polyelectrolyte gelling agent. Only polyvinyl alcohol in combination with a borate are disclosed as forming a gelled material, and this polymer is not a polyelectrolyte. There is no teaching or suggestion in EP 1148104 to use any other type of gelling agent, and, in particular, those of the type disclosed in present claim 1.

Belmont et al. teaches the use of modified pigments having attached organic groups in ink jet inks. However, while various conventional components may be added, there is no teaching or suggestion of the use of gelling agents and, in particular, hydrophobically modified polyelectrolytes. Therefore, Belmont et al. does not cure the deficiencies of EP 1148104. The combination of EP 1148104 and Belmont et al. would not result in the inkjet ink system of the present invention. Instead, the combination would be an inkset for inkjet printing which uses a modified pigment having attached at least one organic group and polyvinyl alcohol.

Applicant therefore believes that claim 1 is patentable over EP 1148104 in view of Belmont et al. Claims 9-10, which, as amended, depend directly from claim 1, disclose further embodiments of the present invention and, for at least the reasons discussed above, should also be patentable over EP 1148104 in view of Belmont et al.

Regarding WO 00/37168, this reference teaches dispersants comprising a hydrophobic segment and a hydrophilic segment comprising a polyelectrolyte. These dispersants can be used with a variety of pigments. However, as discussed in more detail above, there is no disclosure of the use of a modified pigment comprising a pigment having attached at least one organic group. There is no teaching or suggestion that anything but conventional pigments can be used in combination with the disclosed dispersing agents.

Belmont et al. teaches the use of modified pigments having attached organic groups in ink jet inks. These modified pigments have improved dispersibility in aqueous medium compared to untreated pigments. While various conventional ingredients may be added, Belmont et al. teaches that dispersing

agents are not necessary to produce usable inks with a modified pigment (see column 4, lines 25-34). Therefore, one of ordinary skill in the art would not be motivated to combine WO 00/37168 with Belmont et al. since WO 00/37168 discloses specific types of dispersing agents and the modified pigments used in Belmont et al. are already dispersible.

Furthermore, there is no teaching or suggestion in either reference of how to choose a dispersant for use with a modified pigment. Thus, one of ordinary skill in the art would not be able to combine these references and thereby produce the inkjet ink system of the present invention. In comparison, the present application discloses various combinations of gelling agent and modified pigment. For example, the present application teaches that it is preferred that the pigment and the gelling agent do not have opposing charges (see paragraph [0051]). Preferred combinations include gelling agents comprising an ionic or ionizable monomer unit and a modified pigment having attached at least one ionic or ionizable group, where both are anionic or anionizable or both are cationic or cationizable. Thus, specific combinations of gelling agent and modified pigment are disclosed, which are not taught or suggested in WO 00/37168 or Belmont et al, either alone or in combination.

In addition, while WO 00/37168 teaches dispersants having hydrophobic and polyelectrolyte segments, these are not gelling agents and, therefore, are not the hydrophobically modified polyelectrolyte gelling agents of the present invention. No gellation of this dispersant is described anywhere in WO 00/37168. In fact, as discussed in more detail above, WO 00/37168 teaches away from gel formation by the dispersant. Therefore, one of ordinary skill in the art would not be motivated to combine WO 00/37168 and Belmont et al. in order to provide for an inkjet ink system comprising a modified pigment and a gelling agent. Even if one were to combine these references, the combination would not be a modified pigment with a gelling agent but rather a modified pigment with a dispersing agent, avoiding gellation.

Applicant therefore believes that claim 1 is patentable over WO 00/37168 in view of Belmont et al. Claims 9-10, which, as amended, depend directly from claim 1, disclose further embodiments of the present invention and, for at least the reasons discussed above, should also be patentable over WO 00/37168 in view of Belmont et al.

Regarding Grezzo Page et al., this reference teaches dispersants useful in ink jet inks which are graft polymers having a water soluble hydrophilic backbone and at least one discrete hydrophobic side chain. Various types of pigments are described. However, as discussed in more detail above, there is no disclosure of the use of a modified pigment comprising a pigment having attached at least one organic group. There is no teaching or suggestion that anything but conventional pigments can be used in combination with the disclosed dispersing agents.

Belmont et al. teaches the use of modified pigments having attached organic groups in ink jet inks. These modified pigments have improved dispersibility in aqueous medium compared to untreated pigments. While various conventional ingredients may be added, Belmont et al. teaches that dispersing agents are not necessary to produce usable inks with a modified pigment (see column 4, lines 25-34). Therefore, one of ordinary skill in the art would not be motivated to combine Grezzo Page et al. with Belmont et al. since Grezzo Page et al. discloses specific types of dispersing agents and the modified pigments used in Belmont et al. are already dispersible.

Furthermore, there is no teaching or suggestion in either reference of how to choose a dispersant for use with a modified pigment. Thus, one of ordinary skill in the art would not be able to combine these references and thereby produce the inkjet ink system of the present invention. In comparison, the present application discloses various combinations of gelling agent and modified pigment. For example, the present application teaches that it is preferred that the pigment and the gelling agent do not have opposing charges (see paragraph [0051]). Preferred combinations include gelling agents comprising an ionic or ionizable monomer unit and a modified pigment having attached at least one ionic or ionizable group, where both are anionic or anionizable or both are cationic or cationizable. Thus, specific combinations of gelling agent and modified pigment are disclosed, which are not taught or suggested in Grezzo Page et al. or Belmont et al., either alone or in combination.

In addition, while Grezzo Page et al. teaches graft polymer dispersants having a hydrophilic backbone and at least one hydrophobic side chain, there is no gellation of this dispersant described in Grezzo Page et al. Therefore, one of ordinary skill in the art would not be motivated to combine Grezzo Page et al. and Belmont et al. in order to provide for an inkjet ink system comprising a modified pigment and a gelling agent. Even if one were to combine these

references, the combination would not be a modified pigment with a gelling agent but rather a modified pigment with a dispersing agent.

Applicant therefore believes that claim 1 is patentable over Grezzo Page et al. in view of Belmont et al. Claims 9-10, which, as amended, depend directly from claim 1, disclose further embodiments of the present invention and, for at least the reasons discussed above, should also be patentable over Grezzo Page et al. in view of Belmont et al.

Regarding Maeda et al., this reference teaches an ink-jet ink recording process comprising the use of an ink containing a coloring matter, a liquid medium, and at least one thermoreversible thickening polymer. Various types of pigments are described. However, as discussed in more detail above, there is no disclosure of the use of a modified pigment comprising a pigment having attached at least one organic group. Furthermore, and also as discussed in more detail above, the thermoreversible thickening polymer used in the process of Maeda et al. is not a gelling agent as in the present application. Thus, Maeda et al. does not teach or suggest the combination of a modified pigment and a gelling agent, in particular, a hydrophobically modified polyelectrolyte.

Belmont et al. teaches the use of modified pigments having attached organic groups in ink jet inks. However, while various conventional components may be added, there is no teaching or suggestion of the use of gelling agents and, in particular, hydrophobically modified polyelectrolytes. Therefore, Belmont et al. does not cure the deficiencies of Maeda et al. The combination of Maeda et al. and Belmont et al. would not result in the inkjet ink system of the present invention. Instead, the combination would be an ink-jet ink process using an ink containing a modified pigment having attached at least one organic group and a thermoreversible thickening polymer.

Applicant therefore believes that claim 1 is patentable over Maeda et al. in view of Belmont et al. Claims 9-10, which, as amended, depend directly from claim 1, disclose further embodiments of the present invention and, for at least the reasons discussed above, should also be patentable over Maeda et al. in view of Belmont et al.

Therefore, Applicant believes that claims 8-10 are patentable over EP 1148104, WO 00/37168, Grezzo Page et al., or Maeda et al., any of which in view of Belmont et al., and respectfully request that this rejection be withdrawn.



U.S. Patent Application No.: 10/056,777


Art Unit: 1714

Page 26

Conclusion

In view of the foregoing remarks, Applicant believes that this application is considered to be in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would further expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

By: 
Robert M. Amici
Reg. No. 52,554
Michelle B. Lando
Reg. No. 33,941
CABOT CORPORATION
Law Department
157 Concord Road
Billerica, MA 01821-7001

Date: February 27, 2004
Attorney Docket No.: 01064